

Science Bowl Questions 1994

Round 15

Toss-Up

1. GENR; Multiple Choice: Increasing the compression ratio in gasoline fueled car engines usually:
- a) Increases the emission of sulfur oxides
 - b) Increases the emissions of hydrocarbons
 - c) Increases the emissions of nitrogen oxides
 - d) Decreases the emissions of sulfur oxides

ANSWER: C – INCREASES THE EMISSION OF NITROGEN OXIDES

Bonus

1. GENR; Multiple Choice: Diesel fueled car engines are much more efficient than gasoline fueled car engines when:
- a) They are at a high load
 - b) They are at a very low load
 - c) They are at a high altitude
 - d) They are at a low altitude

ANSWER: B – THEY ARE AT A VERY LOW LOAD

Toss-Up

2. PHYS; Multiple Choice: In a dc (direct current) electrical circuit electron flow is:
- a) from the negative battery terminal to the positive
 - b) the same as conventional current flow
 - c) from the positive battery terminal to the negative
 - d) not a reliable indicator of current direction

ANSWER: A – FROM THE NEGATIVE BATTERY TERMINAL TO THE POSITIVE

Bonus

2. PHYS; Short Answer: Edison initially promoted the use of direct current. Who was known as the main promoter of alternating current?

ANSWER: (NIKOLA) TESLA (ACCEPT WESTINGHOUSE)

Toss-Up

3. BIOL; Multiple Choice: Plasmolysis is when:
- a) cells lose water and shrink

- b) cells gain water and burst
- c) cells ingest food particles
- d) cells expel waste products

ANSWER: A – CELLS LOSE WATER AND SHRINK

Bonus

3. BIOL; Multiple Choice: Squamous cells are a type of:

- a) connective cell
- b) muscle cell
- c) epithelial cell
- d) bone cell

ANSWER: C – EPITHELIAL CELL

Toss-Up

4. ASTR; Short Answer: Who was the first man to orbit the Earth?

ANSWER: YURI GAGARIN

Bonus

4. ASTR; Short Answer: What Italian astronomer wrote The Scary Messenger?

ANSWER: GALILEO

Toss-Up

5. CHEM; Short Answer: What is the name given to a semisolid suspension of a material of high molecular mass in a liquid solvent?

ANSWER: GEL

Bonus

5. CHEM; Short Answer: Pi bonds are formed by the overlap of what specific type of orbitals:

ANSWER: UNHYBRIDIZED P ORBITALS (ACCEPT ATOMIC P ORBITALS)

Toss-Up

6. COMP; Short Answer: What does the acronym LISP stand for?

ANSWER: LIST PROCESSING

Bonus

6. COMP; Short Answer: What is the only data structure in the programming language LISP?

ANSWER: A LIST

Toss-Up

7. BIOL; Multiple Choice: Transport of materials against a concentration gradient is done through:
- a) passive transport
 - b) facilitated transport
 - c) active transport
 - d) None of the above

ANSWER: C – ACTIVE TRANSPORT

Bonus

7. BIOL; Multiple Choice: Which of the following statements about meristematic cells is not true:
- a) they are thin walled with large nuclei
 - b) they occur at the growing tips of roots and stems
 - c) they occur at the periphery of roots and stems
 - d) they provide a protective covering for the plant

ANSWER: D – THEY PROVIDE A PROTECTIVE COVERING FOR THE PLANT

Toss-Up

- PHYS; Multiple Choice: The height to which a liquid will rise in a glass capillary tube partially immersed in the liquid is related to what physical property of the liquid?
- a) Its dielectric constant
 - b) Its surface tension
 - c) Its thermal conductivity
 - d) Its heat capacity

ANSWER: D – THEY PROVIDE A PROTECTIVE COVERING FOR THE PLANT

Bonus

- PHYS; Multiple Choice: Two identical cylindrical disks have a common axis. Initially, one of the disks is spinning. When the two disks are brought into contact, they stick together. Which of the following is true?
- a) the total kinetic energy and the total angular momentum are unchanged from their initial values
 - b) both the total kinetic energy and the total angular momentum are reduced to half of their original values
 - c) the total angular momentum is unchanged, and the total kinetic energy is reduced to original values
 - d) the total angular momentum is unchanged, and the total kinetic energy is reduced to half its original value.

ANSWER: D – THE TOTAL ANGULAR MOMENTUM IS UNCHANGED, AND THE TOTAL KINETIC ENERGY IS REDUCED TO HALF OF ITS ORIGINAL VALUE

Toss-Up

9. ERSC; Multiple Choice: which of the following would be true if the Earth did not permanently tilt on its axis?
- a) a day would last for 6 months at the equator
 - b) a lunar month would last 90 days
 - c) a year would last 274 days
 - d) there would be no seasons in the northern and southern latitudes

ANSWER: D – THERE WOULD BE NO SEASONS IN THE NORTHERN AND SOUTHERN LATITUDES

Bonus

9. ERSC; Multiple Choice: Ozone pollution in Los Angeles is usually the greatest during the:
- a) nights in the winter
 - b) daytime in the winter
 - c) daytime in the summer
 - d) nights in the summer

ANSWER: C – DAYTIME IN THE SUMMER

Toss-Up

10. CHEM; Short Answer: Who conceived the modern atomic theory?

ANSWER: (JOHN) DALTON

Bonus

10. CHEM; Multiple Choice: Which of the following is NOT a base in DNA?
- a) uracil
 - b) guanine
 - c) adenine
 - d) cytosine

ANSWER: A - URACIL

Toss-Up

11. BIOL; Multiple Choice: Relative to the water in which the fish finds itself, the tissues of a saltwater fish of the class Osteichthyes are:

- a) isotonic
- b) hypertonic
- c) hypotonic
- d) None of the above

ANSWER: C - HYPOTONIC

Bonus

11. BIOL; Multiple Choice: During protein synthesis, DNA serves as a template for:

- a) DNA
- b) MRNA
- c) TRNA
- d) None of the above

ANSWER: B - MRNA

Toss-Up

12. CHEM; Short Answer: What is the term used to describe a compound that contains no water of crystallization?

ANSWER: ANHYDROUS

Bonus

12. CHEM; Short Answer: What molten substance is used in the Hall process to reduce aluminum?

ANSWER: CRYOLITE

Toss-Up

13. MATH; Multiple Choice: Auditions are being held for a new musical group called “All Hell Breaks Loose”. The group will consist of 5 guitar players and 2 drummers. 12 guitar players and 5 drummers try out. How many combinations of guitar players can be chosen?

- a) 5
- b) 360
- c) 792
- d) 95,040

ANSWER: C – 792

Bonus

13. MATH; Short Answer: How many different sets of musicians can be chosen for the groups?

ANSWER: 7,920

Toss-Up

14. GENR; Multiple Choice: Which of the following is NOT in igneous rock?

- a) shale
- b) obsidian
- c) granite
- d) basalt

ANSWER: A – SHALE (SHALE IS A METAMORPHIC ROCK)

Bonus

14. GENR; Multiple Choice: Which of the following does not belong with the others:

- a) fer-de-lance
- b) bushmaster
- c) gecko
- d) cobra

ANSWER: C – GECKO

Toss-Up

15. BIOL; Multiple Choice: Which of the following is not released by the anterior pituitary gland?

- a) growth hormone
- b) insulin
- c) gonadotrophins
- d) thyroid stimulating hormone

ANSWER: B – INSULIN

Bonus

15. BIOL; Multiple Choice: Which is not true about the lymphatic system in mammals?

- a) it returns excess fluids and proteins to the blood
- b) it filters blood
- c) it is involved in the formation of certain white blood cells
- d) it has its own heart which pumps lymph throughout the body

ANSWER: D – IT HAS ITS OWN HEART WHICH PUMPS LYMPH THROUGHOUT THE BODY

Toss-Up

16. ASTR; Short Answer: What is a second full moon in a month called?

ANSWER: A BLUE MOON

Bonus

16. ASTR; Short Answer: What does a heliologist study?

ANSWER: THE SUN

Toss-Up

17. PHYS; Multiple Choice: A physics student is looking at the edge of a wire that has electrons coming out straight at him. What is the orientation of the magnetic field of this wire?
- a) counterclockwise about the wire
 - b) from left to right through the wire
 - c) from right to left through the wire
 - d) clockwise about the wire

ANSWER: D – CLOCKWISE ABOUT THE WIRE

Bonus

17. PHYS; Multiple Choice: A solid cylinder, a hollow cylinder, and a solid cube, all of equal masses, are released at the top of an inclined plane. The cylinders roll down and the block slides down, all with negligible frictional losses. Which of the following will happen?
- a) the hollow cylinder arrives at the bottom first
 - b) the solid cube arrives at the bottom first
 - c) the solid cylinder arrives at the bottom first
 - d) they all arrive at the bottom simultaneously

ANSWER: B – THE SOLID CUBE ARRIVES AT THE BOTTOM FIRST

Toss-Up

18. CHEM; Short Answer: What is the chemical name of Teflon, the nonstick coating on cookware?

ANSWER: POLYTETRAFLUOROETHYLENE

Bonus

18. CHEM; Short Answer: Thermite is a mixture of hematite and an element. Identify the element.

ANSWER: ALUMINUM

Toss-Up

19. ERSC; Multiple Choice: Petroleum is often found in association with which of the following geological features?

- a) Batholiths
- b) Calderas
- c) Eskers
- d) Salt domes

ANSWER: D – SALT DOMES

Bonus

19. ERSC; Short Answer: The terms “Nebraskan,” “Kansan,” “Illinoisan,” and “Wisconsinan” refer to what geologic events in earth history?

ANSWER: NORTH AMERICAN CONTINENTAL CLACIAL STAGES (DURING LATEST TERTIARY AND QUATERNARY PERIODS)

Toss-Up

20. COMP; Short Answer: Give the value of the largest integer that can be written as an 8-bit binary number.

ANSWER: 255 or 2 TO THE 8TH POWER, MINUS 1

Bonus

20. COMP; Short Answer: In BASIC, one might commonly begin a loop with the statement:
FOR I = 1 TO 5

What statement would be used to end this loop?

ANSWER: NEXT I

Toss-Up

21. BIOL; Multiple Choice: Which type of skeletal system do insects have:

- a) hydrostatic
- b) exoskeleton
- c) endoskeleton
- d) insects do not have skeletons

ANSWER: B – EXOSKELETON

Bonus

21. BIOL; Multiple Choice: Which animal is most closely related to an octopus:

- a) jellyfish
- b) earthworm
- c) planaria
- d) clam

ANSWER: D – CLAM

Toss-Up

22. MATH; Multiple Choice: What percentage is closest to the likelihood that 2 people in a group of 3 have the birthday on the same day?

- a) 67%
- b) 33%
- c) 25%
- d) less than 1%

ANSWER: D – LESS THAN 1%

Bonus

22. MATH; Multiple Choice: How many people would have to be in a group to have a 50% probability that 2 people have the same birthday?

- a) 13
- b) 23
- c) 133
- d) 183

ANSWER: B – 23

Toss-Up

23. PHYS; Short Answer: What is the phase angle (in degrees) between current and voltage of a resonating R-C-L circuit?

ANSWER: 0 DEGREES

Bonus

23. PHYS; Multiple Choice: If the sum of the torques on a body about a fixed axis is not zero, the body most certainly

- a) experiences transnational acceleration
- b) experiences precession
- c) experiences rotational inertia
- d) experiences angular acceleration

ANSWER: D – EXPERIENCES ANGULAR ACCELERATION

Toss-Up

24. CHEM; Short Answer: What acid is prevalent in the human stomach?

ANSWER: HYDROCHLORIC ACID (ACCEPT HCl OR MURIATIC ACID)

Bonus

24. CHEM; Multiple Choice: Which of the following molecules is polar?

- a) Iodine
- b) Carbon Dioxide
- c) Carbon Monoxide
- d) Chlorine

ANSWER: C – CARBON MONOXIDE

Toss-Up

25. PHYS; Multiple Choice: When a person hangs a door with two hinges, which hinge or hinges on the frame pushes against the door?

- a) top hinge
- b) both hinges
- c) bottom hinge
- d) neither hinge

ANSWER: C – BOTTOM HINGE

Bonus

25. PHYS; Multiple Choice; The Cavendish experiment is often described in elementary textbooks as “weighing on earth”. In fact, it was designed to measure the:

- a) acceleration due to gravity
- b) mass of the earth
- c) gravitational constant G
- d) variation of gravity with height

ANSWER: C – GRAVITATIONAL CONSTANT G
